

# Modified fibroblast growth factor in combination with alpine algae and matrikine peptide in anti-aging sensitive skin care.

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## Introduction

Aging results mainly in the loss of dermal collagen and the accumulation of unorganized collagen and elastin fibers in the dermis, which leads to the appearance of the most common signs of aging, i.e., wrinkles, elastosis and loss of skin tone. Growth factors play an important role in reversing the effects of skin aging mediated both by chronological and environmental factors. Aged sensitive skin is more prone to reactions such as redness and itching, so the proper skin care is essential. Our previous research showed the great anti-wrinkle properties of modified FGF1. We would like to check if it is suitable for very sensitive skin in combination with 2 types of algae extracts (alpine algae and Wakame) and matrikine peptide.

The aim of this study was to examine the anti-wrinkle and soothing efficacy of the cream containing modified FGF1 in lipid spheres, extracts from algae's and Palmitoyl Hexapeptide-12 and its placebo version in patients with sensitive skin and prone to allergy.

## Methods

**In vitro tests** were described previously according to Żerańska J., Pasikowska M., Szczepanik B., Młosek K., Malinowska S., Dębowska R., Eris I.: A study of the activity and effectiveness of recombinant fibroblast growth factor (Q4OP/S47I/H93G rFGF-1) in anti-aging treatment; *Adv Dermatol Allergol* 2016, XXXIII(1): 28-36.

**Skin patch test** was performed on 20 subjects with allergy-prone skin to confirm safety of the emulsion.

**Panel of volunteers:** 41 women with visible signs of facial aging and very sensitive skin.

**Study design:** The cream (no. 5744) with FGF1, algae's and hexapeptide was used on the right side of the face and placebo on the left side for 3 weeks in a double-blind study. The skin evaluation was performed twice – prior to and after the treatment.

**Instrumental measurement and subjective assay:** The study included analysis of skin elasticity (Cutometer ,CK), moisturization (Corneometer, CK), skin roughness and visibility (Visioscan), volume and number of wrinkles and skin texture (Visia). At the end of the study volunteers completed self-evaluation questionnaire.

## Results

Our previous *in vitro* study showed, that FGF-1 most effectively stimulated the proliferation of fibroblasts from donors of 34 and 40 years old (Figure 1). In the epidermal KB line there was a statistically significant increase of 25% (10 ng/ml FGF-1) and of 13% (100 ng/ml FGF-1) in cell viability. In the HaCaT line there was an improvement in cell viability of about 42% after stimulation with 10 ng/ml FGF-1, and 11% after stimulation with 100 ng/ml FGF-1 (Figure 2).

The patch test did not show any irritating or sensitizing properties of the tested cosmetic formulation (data not shown).

The cream was also well-tolerated by all participants with sensitive and prone to allergy skin during 3-weeks of tested product usage.

After 3 weeks of 5744 formula application we observed improvement in the skin elasticity by 10% and decrease in skin roughness by -27% in comparison to no effect after placebo version (Fig.3). Moreover the reduction of wrinkles volume by 20% and improvement in skin moisturization by 20% were noticed after cream application in comparison to placebo (-12% and 18%, respectively) (Fig. 3).

Volunteers self-evaluation taken after first use of night cream confirmed improvement in skin condition (Fig. 5).

100% of respondents confirmed, that tested night cream was gentle for their sensitive skin. Skin was moisturized and smooth for a long time and soft to the touch according to 96% of them.

The soothing effect and reduction in skin dryness were confirmed by 92% of volunteers (Fig.6).

## Conclusion

The cream no. 5744 containing modified fibroblast growth factor in combination with algae's and matrikine peptide had a remarkable impact on anti-wrinkle properties of the sensitive skin. Dermatological patch test study indicated that the tested emulsion did not show any irritating or sensitizing properties. The instrumental assay showed better anti-aging properties of active cream, as compared to the placebo. The improvement was observed in almost all measured parameters. To conclude, the products showed impressive results and a great potential in anti-aging treatment of sensitive skin. However, longer treatment is needed for visible and noticeable changes.

## Results

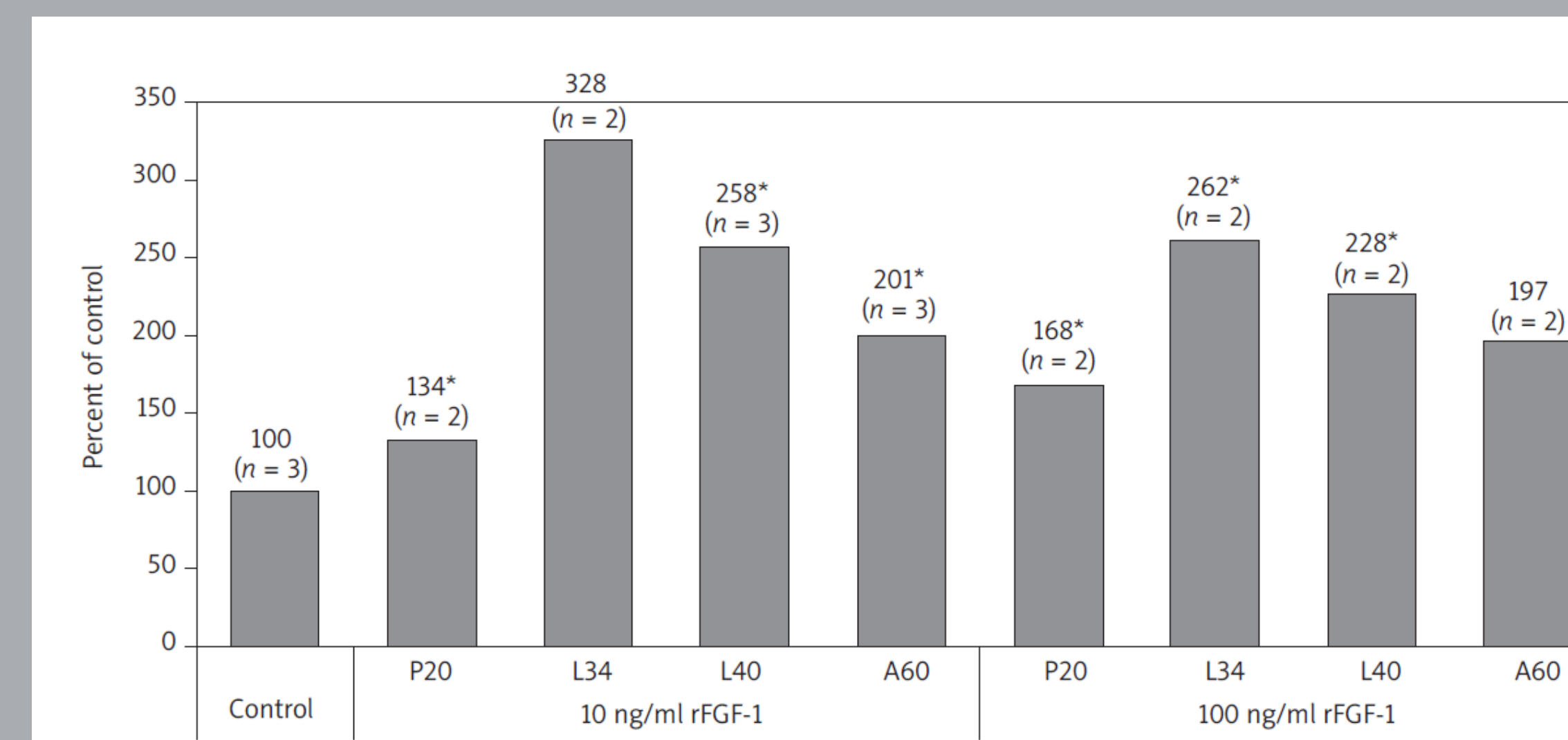


Figure 1. A study of the activity and effectiveness of FGF-1 in anti-aging treatment. The mean viability of human primary fibroblasts from 20- (P20), 34- (L34), 40- (L40) and 60- (A60) year-old donors (MTT assay) after 7-days' stimulation by FGF-1 in concentrations of 10 or 100 ng/ml. Untreated cells were used as a control (Żerańska et al. *Adv Dermatol Allergol* 2016).

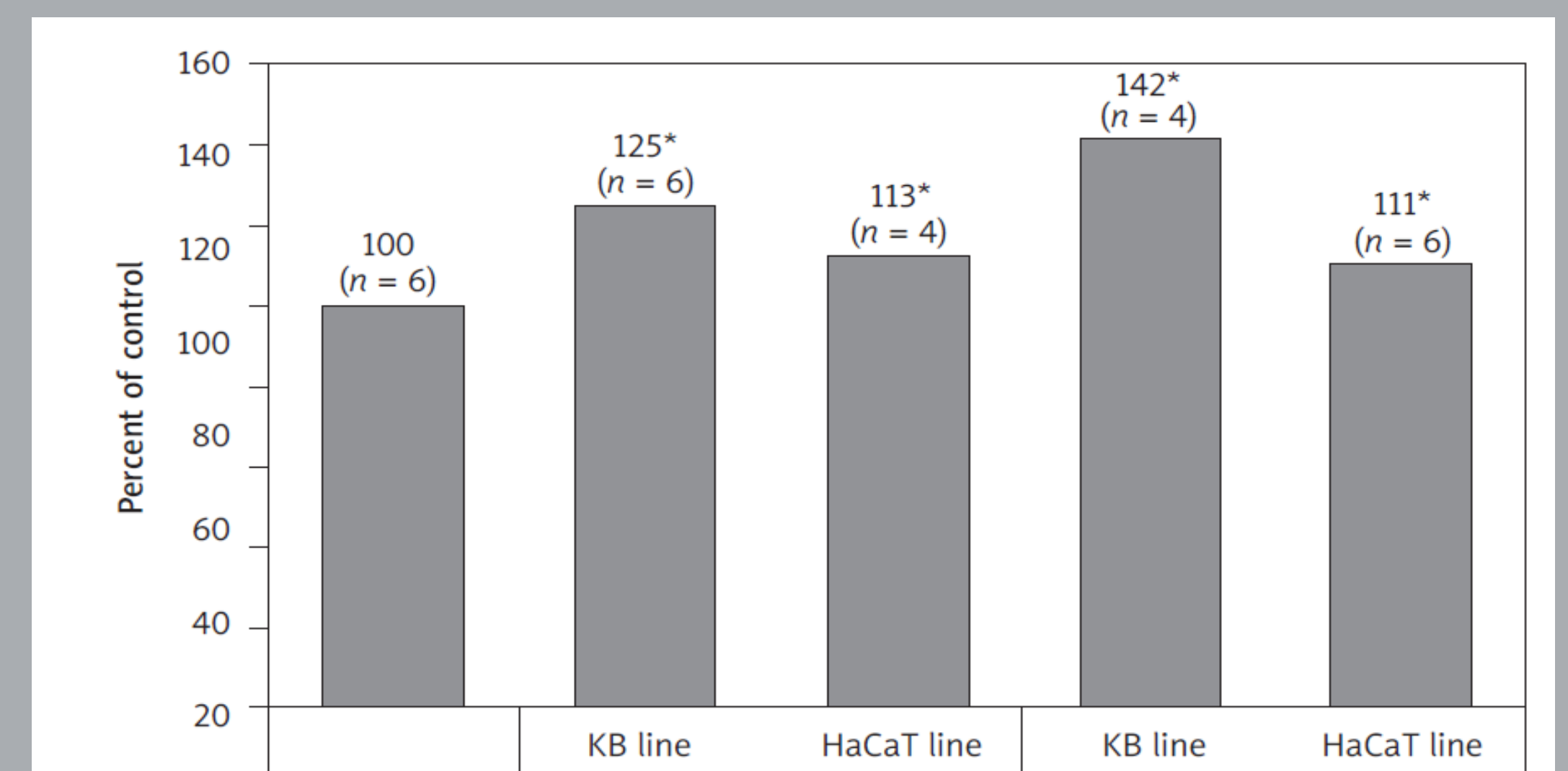


Figure 2. The mean viability of keratinocytes: KB and HaCaT lines (MTT assay) after 24 h' stimulation by FGF-1 in concentrations of 10 or 100 ng/ml. Untreated cells were used as a control (Żerańska et al. *Adv Dermatol Allergol* 2016).

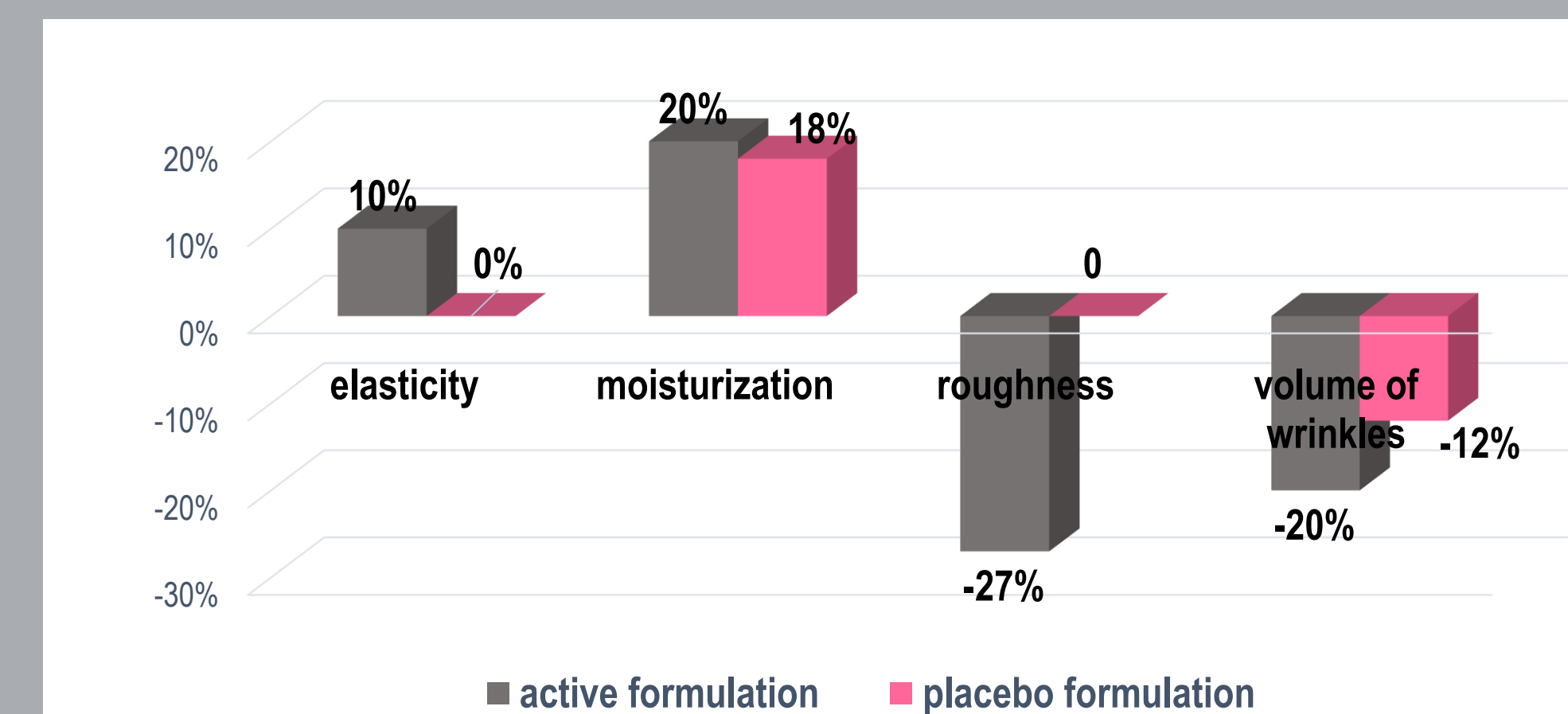


Figure 3. Instrumental skin analysis taken at baseline (before application) and after 3 weeks of using active and placebo formula of night cream no. 5744. Biometric measurements showed an improvement in skin moisturization by 20% and elasticity by 10% after active cream application. Roughness level was reduced by 27%, volume of wrinkles decreased by 20%. Placebo formulation usage improved skin moisturization by 18% and decrease wrinkles volume by 12%.



Figure 4. Instrumental analysis showed the reduction of wrinkles by 62% (upper picture) and 16% (bottom picture) after 3 weeks night cream 5744 application.

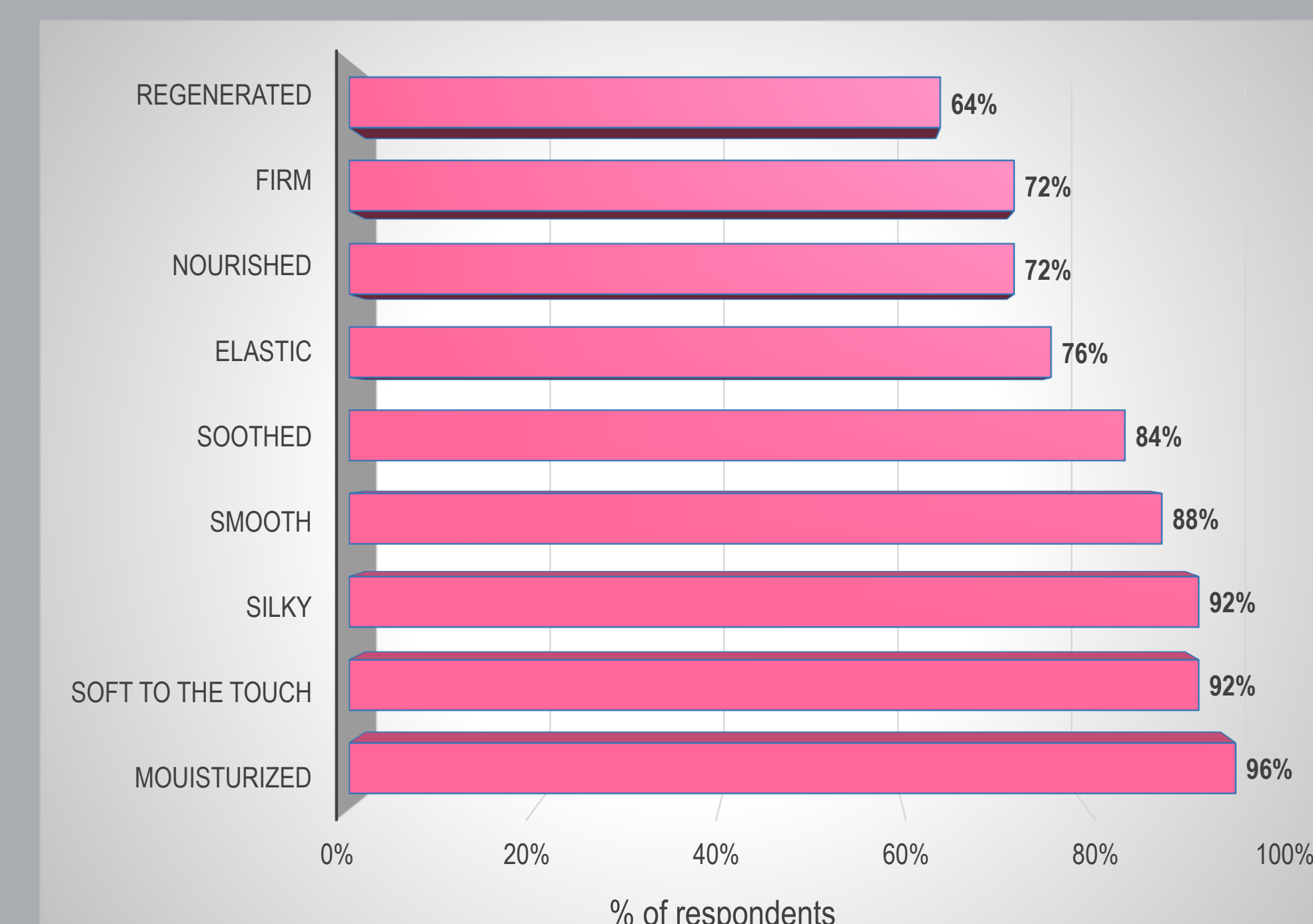


Figure 5. Respondents self- assessment taken after one use of active night cream showed most of all improvement in skin moisturization (96%), skin become soft to the touch and silky (92%), smooth (88%) and soothed (84%).

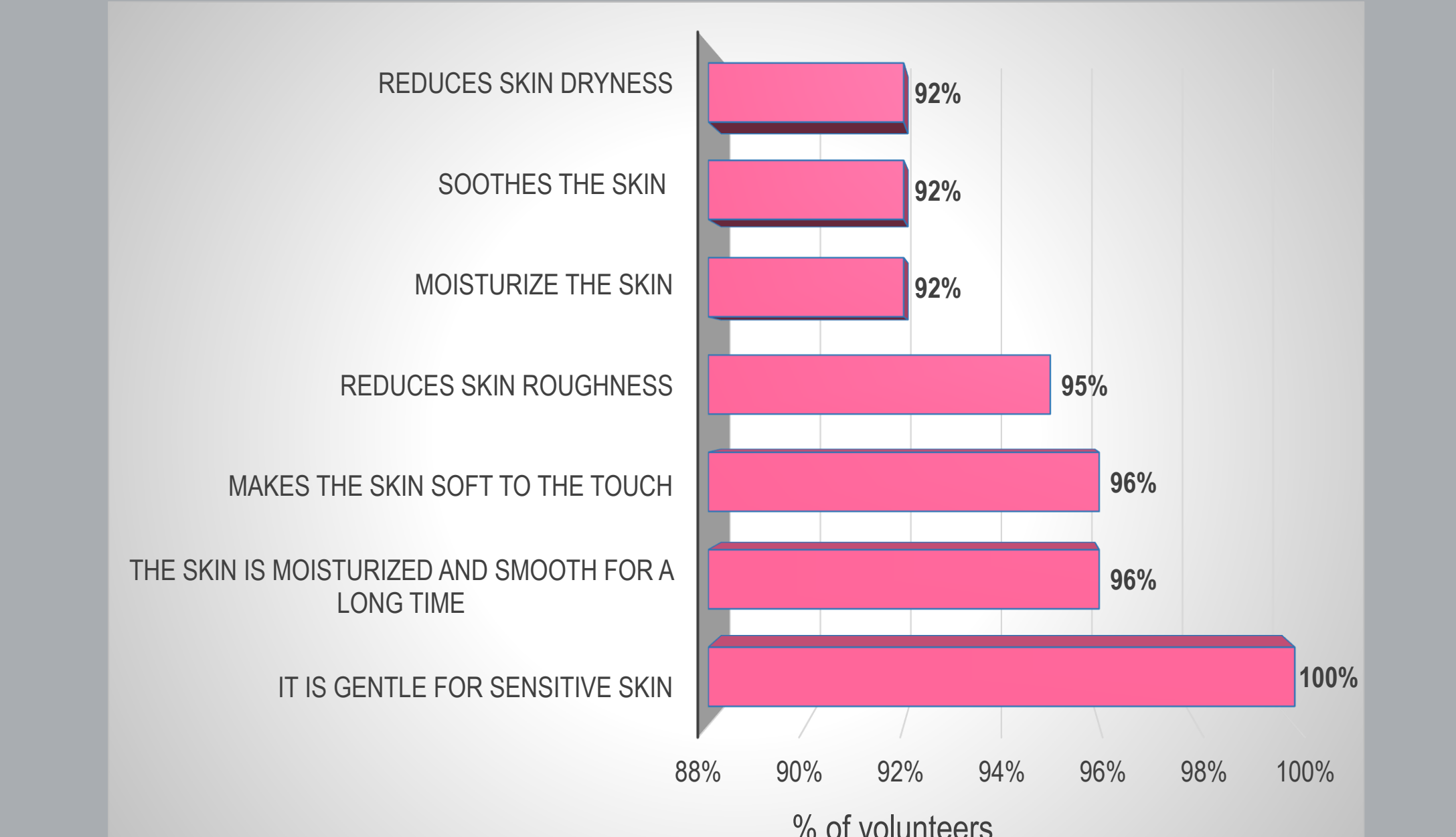


Figure 6. Volunteers self-assessment taken after 3 weeks of tested active night cream usage confirmed, that tested product is gentle for sensitive skin (100%) and caused improvement in skin moisturization and smoothness (96%). Moreover volunteers noticed that their skin become sooth, less dry (92%) and less rough (95%).